

REMARKS

In view of the above amendments and following remarks, reconsideration and further examination are respectfully requested.

A replacement formal drawing (Fig. 2(a)) has been provided so as to show the second conduit having a larger diameter than the first conduit. The specification has been correspondingly amended in view of this new drawing.

Claims 15-30 have been cancelled and claims 31-42 have been added. New claims 31-42 have been drafted taking into account the 35 U.S.C. § 112, second paragraph, issue raised by the Examiner are believed to be free of this issue, and are otherwise believed to be in compliance of 35 U.S.C. § 112, second paragraph.

In the Office Action: claims 15, 17, 18 and 27 were rejected under 35 U.S.C. § 102(b) as being anticipated by GB '764; claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over GB '764 in view of Heo et al.; and claims 19-26 and 28-30 were objected to as being dependent upon a rejected base claim, but indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Please note that Heo et al. is unavailable as prior art because the international filing date of the instant application (February 17, 2003) is prior to the earliest effective filing date of Heo et al. (April 17, 2003). Thus, in view of Heo et al. being unavailable as prior art, and in view of the allowable subject matter as indicated by the Examiner, claims 31-42 have been added. New claims 31-42 correspond to former claims 16, 19-26 and 28-30 as indicated in the following table.

New Claims	Former Claims
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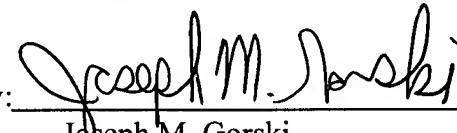
Accordingly, because only claims are presented which have been indicated by the Examiner to be allowable, or include subject matter not rejected based on available prior art, it is respectfully submitted that the application is now in condition for allowance, with the allowable claims being 31-42.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early Notice of Allowance is earnestly solicited.

If after reviewing this Amendment, the Examiner believes that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the Applicants' undersigned representative by telephone to resolve such issues.

Respectfully submitted,

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10 **WASHING AID DISPENSER AND WASHING MACHINE COMPRISING
SAID-THE DISPENSER**

1 **DESCRIPTION**

15 The present invention refers to a dispenser of washing products and aids, such as detergents or whiteners, fabrics softeners, scents and similar aids, for use in connection with a washing machine, such as a clothes washing machines.

20 It is largely known that these products and substances are poured by the-a user into the-specially provided compartments of the dispenser before the machine is started, and are thereafter introduced from such a dispenser into the-a washing tub of the machine at pre-established times and phases of the-a washing cycle being performed. Currently used detergent dispensers are generally provided as a single-piece component part comprising at least two distinct compartments adapted to receive and hold washing powders or liquids on the-one side and, on the-other-another side, generally liquid rinsing aids. For transferring liquid substances from the dispenser into the washing tub of the machine, one or more siphons 25 are usually provided within the-a compartment or compartments containing such substances; the inflow-Inflow of water into the dispenser in theduring a phase of the-a washing cycle that calls for liquid substances to be introduced into the washing tub causes, upon reaching

~~the-a~~ necessary water head, ~~the-a~~ siphon to be triggered, i.e. primed into working and, as a result, ~~the-a~~ liquid detergent substance to be drawn in from the dispenser towards the washing tub is duly mixed with ~~the~~ inflowing water.

5 DE 37 14 301 A1 discloses a plurality of siphon blocks, formed from a small standpipe and a cap, arranged in a washing-agent flush-in tray in such a way that, if one siphon fails to suck up the mixture consisting of washing-agent and water, the other siphons continue to work.

A typical drawback which is encountered with currently used types of dispensers lies in the fact that the siphon must work with liquids of different densities (water and liquid washing aid, e.g. a fabric softener), which do not mix ~~up~~-very well, i.e. homogeneously together, but, owing to ~~the-a~~ flow pattern that is brought about inside the dispenser, tend to rather take a stratified or layered form, without any clear separation between water and washing substance. Such a layer-forming mixing of water and washing aid causes the siphon to work in a discontinuous manner, in which water is drawn in preferentially with respect to the washing aid. As a result, it quite often occurs that, upon conclusion of ~~the~~ a washing cycle performed by the machine, remnants of ~~the~~-denser washing aids or products, such as for instance the fabric softener, can still be found on ~~the-a~~ bottom of ~~the~~-respective compartments in the dispenser.

Such a drawback might be overcome through an increase in ~~the~~-inflow pressure of ~~the~~-water supplied to the dispenser, but this would unavoidably give rise to excessive frothing during mixing with ~~the-a~~ liquid detergent substance so as to anyway cause the siphon to work irregularly or, in ~~the-a~~ worst case, lead to suds flowing over the dispenser and cause ~~a lot of much~~ inconvenience.

Another possible solution in this connection lies in increasing ~~the~~ negative pressure generated by the siphon so as to obtain a greater draw-in capability. This solution, however, implies an increase in ~~the~~-overall size

of the siphon and, as a result, it turns out to be scarcely practicable due to construction-related limitations imposed by the-a machine requiring extremely reduced sizes in general.

5 It therefore is a main purpose of the present invention to do away with the above-mentioned drawbacks of prior-art solutions by providing a washing aid dispenser for washing machines, which is capable of working in an optimum manner with liquids of different densities, even if they do not mix ~~up~~-homogeneously together inside the dispenser itself.

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Within such a general scope of the invention, a further purpose is to provide a washing aid dispenser which is capable of ensuring complete removal, i.e. suction of ~~the~~-liquid washing substances into the-a washing tub of the-a machine during pre-determined phases of the-a washing cycle, as well as complete removal of any remnant of said-the washing substances from the-a bottom of the-respective compartments in the dispenser at the-an end of the washing cycle.

Another major purpose of the present invention is to provide a washing aid dispenser which is capable of reaching the above-above-specified aims in a manner that is fully reliable and safe for the-a user, in particular without giving rise to any excessive frothing, i.e. formation of foam inside the dispenser itself.

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25 A further major purpose yet of the present invention is to provide a washing aid dispenser which is capable of reaching the above-above-specified aims while keeping sizes and space requirements in general unaltered or, anyway, substantially within due limits, so as to meet the construction-related limitations imposed by the machine.

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A last, but not least purpose of the present invention is to provide a washing aid dispenser which is low in terms of costs and capable of being manufactured with ~~the~~-use of existing, readily available materials,

techniques and machinery.

According to the present invention, these aims and advantages, along with further ones that will become apparent from the following 5 description, are reached in a washing aid dispenser for washing machines incorporating the characteristics as recited and defined in the appended claims-1.

10 Anyway, fFeatures and advantages of the present invention may be more readily understood from the description of some preferred, although not sole, embodiments that is given below by way of non-limiting example examples with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

15 —Figure 1 is a schematic front view of a washing machine incorporating the a washing aid dispenser according to the present invention;

—Figure 2 is a longitudinal-sectional view of a first embodiment of the washing aid dispenser according to the present invention;

20 Fig. 2(a) is a partial schematic cross-sectional view of an alternative washing aid dispenser showing a second conduit to be larger in diameter than a first conduit; and

25 —Figure 3 is a view similar to the one illustrated in Figure 2 of a second embodiment of a washing aid dispenser according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

30 With reference to Figure 1 cited above, the reference numeral 1 is used to generally indicate a washing machine, such as a clothes washing machine, incorporating a washing aid dispenser 2, which is adapted to be pulled out of the a main body of the washing machine 1 itself so as to

enable the-a user to fill the-detergent substances, such as washing powders or liquids, fabric softeners, whiteners, scents and similar aids, into the-respective compartments before starting the washing machine to go through the-a selected washing cycle.

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The washing aid dispenser 2 comprises at least a compartment 3 adapted to contain detergent substances, in particular such aids as fabric softeners, which is in communication with water supply means-structure 4 adapted to deliver water coming from the machine 1. These-This water supply means-structure 4 are-is provided with a water inlet conduit 5, through which the-water, in certain phases of the-a washing cycle, is let into a chamber 6 and, through a plurality of apertures 7, is able to flow into the dispenser 2 so as to mix up-with the detergent substance contained inside the dispenser itself and, thereafter, convey the-a resulting mixture towards the-a washing tub of the machine 1. The-a Arrows A and B indicate the-a flowpath followed by the water, whereas the-a water+softener mixture is conveyed into the washing tub along the-a path indicated by the-arrow C.

20 The washing aid dispenser further comprises a first siphon 8 adapted to draw in the above mentioned mixture from the dispenser and convey it towards the washing tub of the machine. In the-this exemplified embodiment, such a siphon is formed by a first conduit 9, which is open at both its opposite ends and is associated to-with a first cap piece 10 situated thereabove. The-suction, i.e. a drawing-in action starts as soon as the-water flowing into the dispenser 2 reaches the-a level, i.e. the-a head required to prime or trigger the siphon 8 into working, said-with the level or head being defined by the-a distance of the-inner summit 11 of the first cap piece 10 to the-a bottom 12 of the dispenser 2; whereas the suction height h is on the contrary defined by the-a distance of the-a base of the first cap piece 10, or the-a mouth, and the bottom 12 of the dispenser 2.

A peculiar feature of the present invention lies in the fact that the washing aid dispenser 2 is provided with at least a second siphon 14, which is in turn formed by a second conduit 15 which is open at both ends thereof and is associated to with a second cap piece 16 situated thereabove. This second siphon 14 has a suction height H that is differentiated with respect to the suction height of the first siphon 8. With reference to the particular embodiment illustrated in Figure 2, ~~the~~ suction height H of said the second siphon 14 is greater than ~~the~~ suction height h of said the first siphon 8.

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Advantageously, even the-a level or height of the-a water head of the second siphon 14 may be selected to be greater than ~~the-one~~that of the first siphon 8 and, possibly, also the-a diameter of the second conduit 15 may be selected to be larger than the-a diameter of the first conduit 9 as shown in Fig. 2(a).

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According to a preferred embodiment of the present invention, which is exemplified in the illustration appearing in Figure 2, there may also be ~~also~~ provided a third siphon 17, formed again by a third conduit 18 and a third cap piece 19 arranged thereabove. Said The third siphon 17 has a suction height H' that is greater than ~~the~~ suction height H of said second siphon 14; and therefore, the level of the-a water head in ~~the~~ the third siphon 17 may be substantially equal to ~~the-one~~that of the second siphon 14, as illustrated in Figure 2, or even higher than that. It has in fact been found experimentally that such a contrivance proves effective in enabling the siphons 8, 14, 17 to be primed, i.e. triggered into working in a sequence, thereby improving the-an overall operation and efficiency during suction; .in In particular, this is effective in avoiding the-a risk that two contiguous siphons may unprime or deactivate each other.

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The ~~e~~Operation is as follows: as soon as ~~the~~ water is let into the washing aid dispenser 2 through the apertures 7, it starts to mix up-with ~~the~~ fabric softener, or such other washing aid as may be actually present

in the same—dispenser, and to form the afore mentioned stratified water+softener mixture. When ~~the—a~~ water level rises above the inner summit 11 of the first siphon 8, the latter is primed, i.e. triggered into working, and the water+softener mixture starts to be drawn-in and 5 conveyed towards the washing tub of the machine. As the water level continues to rise, even the second siphon 14 and, if provided, the third siphon 17 are primed and triggered into working. ~~The—A~~ suction action of these siphons takes place at different levels of the washing aid dispenser 2, so that ~~the—~~various layers of the above mentioned stratified 10 water+softener mixture that lie at different heights in the dispenser 2 are thereby able to be effectively drawn in and conveyed into the washing tub.

From the above description it can therefore be readily appreciated that the washing aid dispenser according to the present invention is actually 15 able to fully reach the ~~afore—afore~~-stated aims and provide ~~the—~~desired advantages:—in fact, the provision of an additional siphon having a different suction height with respect to ~~said—the~~ first siphon 8 (or draining siphon) enables the stratified water+softener mixture to be drawn in at different heights with respect to the bottom 12 of the dispenser 2, so that 20 ~~the—a~~ problem connected to such a stratification of the mixture owing to ~~the—~~different densities of these two liquids can be effectively overcome.

In this manner, both suction and conveyance of the mixture occur in an optimum manner, notwithstanding ~~the—a~~ lack of homogeneity of the 25 mixture itself, thereby ensuring both full suction of ~~the—~~fabric softener during ~~the—an~~ appropriate phase of ~~the—a~~washing cycle and full removal of any residue thereof from the bottom of the dispenser. Conclusively, ~~the~~ this twofold advantage is achieved of a more rational and efficient utilization of ~~the—~~detergent substances and an enhanced cleanliness of the 30 washing aid dispenser.

It should furthermore be noticed how ~~the~~initially proposed advantages are actually achieved by keeping ~~the~~operating pressures of ~~the~~water and

the-an overall size of the dispenser substantially unaltered.

It shall be appreciated that the above described washing aid dispenser may be the subject of a number of modifications and variants without
5 departing from the scope of the present invention.

So, for instance, Figure 3 can be noticed to illustrate a second embodiment of a washing aid dispenser 102 according to the invention, which comprises at least a compartment 103 that is adapted to receive
10 and hold detergent substances and is in communication with water supply means-structure 104;—these—with this water supply means structure comprise-comprising a water inlet conduit 105, a chamber 106 and a plurality of apertures 107, through which the-water is able to flow into the dispenser 102 so as to mix up-with the-a detergent substance
15 contained therein and then flow out of the dispenser and into the washing tub of the machine.

This washing aid dispenser further comprises a first siphon 108, which is similar to the first siphon 8 discussed above in connection with the first
20 embodiment considered, and which therefore comprises a first conduit 109 that is open at both the-extremities thereof and is associated to-with a first cap piece 110 lying thereabove and defining a suction height h.

The washing aid dispenser 102 is additionally provided with at least a
25 second siphon 114 comprising a second conduit 115 and a second cap piece 116;—the latterwhich cap piece has a base 120 that forms a pre-defined angle with respect to the-bottom 112 of the dispenser 102;—, whereby a suction height is thereby defined which is longitudinally variable along the dispenser 102, in such a manner as to substantially
30 obtain a first suction zone F extending not only in the-a horizontal plane, but also in the-a vertical-one plane.

In an advantageous manner, said-the first suction zone F defined by

the base 120 of the second cap piece 116 starts from a lower level that is equal to or slightly higher than ~~the~~suction height h of said~~the~~first siphon 108 and continues with a pre-determined inclination;—
5 furthermore~~Furthermore, the~~a height of ~~the~~a water head of ~~said~~the second siphon 114 will preferably be greater than ~~the one that~~ of the first siphon 108 and, possibly, even ~~the~~a diameter of the second conduit 115 may be selected to be larger than ~~the~~a diameter of the first conduit 109.

Advantageously, there may be further provided a third siphon 117
10 comprising a third cap piece 119 whose base 121 forms a pre-defined angle with respect to the bottom 112 of the dispenser 102, so as to define a second suction zone F' differentiated from and lying at a higher level than ~~said~~the first suction zone F defined by ~~said~~the second siphon 114.

15 It should be specially stressed how this second embodiment of the dispenser according to the present invention, further to achieving the ~~afore~~afore-specified advantages, proves particularly efficient and advantageous as far as ~~the~~suction of ~~the~~a poorly homogeneous, stratified mixture is concerned. In fact, ~~the~~this particular configuration of the
20 siphons enables a substantially continuous suction zone to be obtained, formed by ~~said~~the first and ~~said~~the second suction zones F and F' and covering substantially most of ~~the~~a height dimension of the dispenser 102. This is very effective in bringing about a sensible improvement in the
25 terms of suction capability of the siphons for a complete removal of both ~~the~~a water+aid mixture and any residue thereof from the dispenser itself.

It will of course also be also-appreciated that ~~the~~materials used to implement the dispenser of the present invention, as well as ~~the~~a shape, form and size of the individual component parts thereof may be from case to case selected to most appropriately comply with particular needs and requirements without departing from the scope of the present invention.
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10 **WASHING AID DISPENSER AND WASHING MACHINE COMPRISING
SAID DISPENSER**

Abstract of the Disclosure

15 The present invention refers to a washing aid dispenser for a washing machine. The dispenser (2, 102) comprises at least a compartment (3, 103), which is adapted to contain the washing aids and is provided with a first siphon (8, 108) having a pre-determined suction height (h) and at least a second siphon (14, 114) having a higher suction height (H) than said the first siphon (8, 108). The first and the second siphon (8, 14, 108, 114) are adapted to draw in and convey towards the a washing tub of the machine layers of the washing aids mixed with water lying at different heights in the dispenser (2, 102).